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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/909,900	07/23/2001	Claudio Gatti	00249-0099	9193

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EXAMINER	
NGUYEN, KIMBINH T	
ART UNIT	**PAPER NUMBER**
2671	

DATE MAILED: 09/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/909,900	GATTI ET AL.	
	Examiner	Art Unit	
	Kimbinh T. Nguyen	2671	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 July 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 4-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/26/01*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1, 4-34 are pending in the application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 4-12, 16-27, 30-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson et al. (5,113,357) in view of Raya et al. "Shape-Based Interpolation of Multidimensional Objects" and Liang et al. (6,606,091).

Claim 1, Johnson et al. teaches a system of extracting a visual feature from a volumetric dataset using an approximate volume (technique of curved surface extraction using volume vector; col. 6, lines 7-19), the system comprising: a) displaying the volumetric dataset (col. 5, lines 55-59; col. 10, lines 42-47); Johnson does not teach a cross section; however, Raya et al. teaches b) defining a selected number of regions distributed in the displayed volumetric dataset, each of the regions containing a cross section of the visual feature therein (fig. 1); c) an interpolator for generating the approximate volume containing the selected regions, the approximate volume comprising a set of voxels selected from the volumetric dataset (see section II. "The interpolation method", pages 33-35) and wherein the selected number of regions are a

subset (a closed subset of R) of the total number of images contained in the volumetric dataset (see page 34, the left column). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the cross section and interpolation method taught by Raya into the extracting a visual feature from a volumetric dataset of Johnson for rendering of geometric volumes, because interpolating time varying 3D objects from its 2D cross sections both in z dimension and the time axis, it would create finer representation (see section II, page 33). Johnson does not teach a mask to render the volumetric dataset; however, Liang et al. teaches d) specifying a plurality of voxels not containing the visual feature (an obscuring portion) in the set of voxels to generate a mask (col. 9, lines 51-56); and e) a volume renderer for using the mask to render the volumetric dataset to extract the visual feature therefrom (col. 10, lines 54-62). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a special rendering mask method taught by Liang into the extracting a visual feature from a volumetric dataset of Johnson for rendering the volume dataset, because using attribute masking in visualization, it would allow a user to render the whole data set as a normal visual volumization (col. 10, lines 59-60).

Claim 4, Johnson et al. teaches specifying a region to be removed, and specifying a region to be visualized (col. 6, lines 36-38; col. 9, line 64 through col. 10, line 10).

Claim 5, Johnson et al. teaches the operator classifies a transfer function selected from the group comprising; opacity, color, texture (col. 2, lines 20-32), and rendering mode (raycasting is simple way of direct voxel rendering (col. 2, lines 42-67).

Claims 6-9, Johnson does not teach a cross section; however, Raya et al. teaches volumetric dataset comprises a set of cross sectional images (see section II and fig.1); each of the regions are polygons (rectangle represents the cross sections; fig. 1) located on the surface of the corresponding selected cross sectional images; the selected regions are oriented in a parallel spaced apart spatial relationship (a set of parallel cross section; see section II, page 33); the set of cross sectional images are selected from the group comprising planar, arbitrary, and curved reformat slice stacks (see section II, fig. 1, pages 33-35) . It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the cross sections taught by Raya into the extracting a visual feature from a volumetric dataset of Johnson for rendering of geometric volumes, because interpolating time varying 3D objects from its 2D cross sections both in z dimension and the time axis, it would create finer representation (see section II, page 33).

Claims 10 and 11, Johnson does not teach the number of regions is less than the number of cross sectional images contained in the set; however, Raya et al. teaches the number of regions is less than the number of cross sectional images contained in the set (the largest grid-point coordinate in the system that is smaller than the number y; see page 34); the regions are used by the interpolator to generate a plurality of approximate volumes for the volumetric dataset (interpolating the cross-sectional boundaries obtained in the system (see section II, page 34). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the cross section and interpolation method taught by Raya into the extracting a visual

feature from a volumetric dataset of Johnson for rendering of geometric volumes, because interpolating time varying 3D objects from its 2D cross sections both in z dimension and the time axis, it would create finer representation (see section II, page 33).

Claim 12, Johnson does not teach a mask to render the volumetric dataset; however; Liang et al. teaches the plurality of approximate volumes are used to define multiple ones of the masks (col. 9, lines 51-56; col. 12, lines 57-65). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a special rendering mask method taught by Liang into the extracting a visual feature from a volumetric dataset of Johnson for rendering the volume dataset, because using attribute masking in visualization, it would allow a user to render the whole data set as a normal visual volumization (col. 10, lines 59-60).

Claim 16, Johnson does not teach iterator for applying the interpolator; however, Raya et al. teaches an iterator for interactively employed by the iterator for applying the interpolator and the operator to the selected number of regions (in every iteration; see section III "Algorithm", pages 35-37). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the algorithms (iterator) taught by Raya into the extracting a visual feature from a volumetric dataset of Johnson for rendering of geometric volumes, because utilize a very desirable feature of the algorithms is that they are highly parallel and are, hence, best suited to the fast-emerging parallel computational technology (see page 41).

Claims 17 and 18, Johnson does not teach rendering pathways for facilitating interactive sculpting; however, Liang et al. teaches duplicate rendering pathways (the optimal path or the best path) are employed by the iterator (the live wire algorithm) for facilitating interactive sculpting (col. 9, lines 24-33); a down-sampled version (sub-sampling the contour points; col. 9, lines 40-43) of the volumetric dataset (unorganized dense points fall into two categories: sculpting-based methods and region-growing) is employed during interactive sculpting (col. 3, lines 53-63). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate an algorithm and an interactive sculpting taught by Liang into the extracting a visual feature from a volumetric dataset of Johnson for rendering the volume dataset, because using existing algorithms for shape reconstruction, sculpting-based methods, it would help user extract volume of interest very easily and quickly (col. 3, lines 8-9).

Claims 19-27 and 30-32, the rationale provided in the rejection of claims 1, 4-12, 17 and 18 are incorporated herein.

Claims 33 and 34, the rationale provided in the rejection of claims 1, and 4 are incorporated herein. In addition, Johnson teaches method and apparatus for performing operations by a computer program stored in the computer (col. 4, lines 42-55) and the data processors of the computer include machines manufactured by Sun Microsystems (col. 5, lines 1-37).

4. Claims 13-15, 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson et al. (5,113,357) in view of Raya et al. "Shape-Based

Interpolation of Multidimensional Objects" and Liang et al. (6,606,091) and further in view of Hunt (3,788,820).

Claims 13-15, Johnson does not teach a jigsaw tool; however, Hunt teaches a jigsaw tool to generate at least one of the plurality of approximate volumes (jigsaw puzzle; col. 4, lines 47-64); the jigsaw tool (extrusion tool design; col. 3, line 2) extrudes a cylindrical approximate volume from one of the regions (col. 7, lines 34-45); the direction of the extrusion is normal to the surface (parallel and perpendicular relationships) upon which the region is defined (col. 3, lines 17-22). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a jigsaw tool and extrusion tool design taught by Hunt into the extracting a visual feature from a volumetric dataset of Johnson for rendering the volume dataset, because using extrusion tool design and extrusion practice, it would achieve streamlined flow s evidenced by uniform reduction in the cross section of the billet extending from the center of the cross section substantially to its periphery, this permits saving cost (col. 3, lines 1-9).

Claims 28 and 29, the rationale provided in the rejection of claims 14 and 15 are incorporated herein.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimbinh T. Nguyen whose telephone number is (703) 305-9683. The examiner can normally be reached on Monday to Thursday from 7:00 AM to 4:30 PM. The examiner can also be reached on alternate Friday from 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman, can be reached at (703) 305-9798. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

September 1, 2004

Kimbinh Nguyen

Patent Examiner AU 2671